PAN-PACIFIC ENTOMOLOGIST
69(1): 12–14, (1993)

NOTES ON THE ETHOLOGY OF *DICOLONUS SPARSIPILOSUM* BACK (DIPTERA: ASILIDAE)

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Abstract.—The presented data are the first biological and behavioral information recorded for the genus *Dicolonus*. Prey, consisting of small Diptera, Hymenoptera and Coleoptera, are taken in flight and manipulated during feeding with the predator's fore tarsi. Males do not exhibit courtship. Mated pairs take the tail-to-tail position, resting on stems of grass and twigs of sagebrush.

Key Words.—Insecta, Diptera, Asilidae, *Dicolonus sparsipilosum,* bionomics

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The genus *Dicolonus* is largely confined to the western United States, with only two species barely reaching British Columbia (Adisoemarto & Wood 1975). Prior to 1975, only two species had been described, *D. simplex* Loew, for which the genus was erected in 1866, and *D. sparsipilosum* described by Back (1909). Three additional species, *D. medium* Adisoemarto & Wood, *D. nigricentrum* Adisoemarto & Wood and *D. pulchrum* Adisoemarto & Wood, were added to the genus by Adisoemarto & Wood (1975). Since the erection of the genus, no biological or behavioral data have been published for any species.

In late June 1977, a small population of *D. sparsipilosum* was studied on a rangeland plateau located beneath Teton Point Overview in Grand Teton National Park, Wyoming, USA. The area was bordered by a grove of quaking aspen (*Populus tremuloides* Michaux), and it was within this ecotone that the majority of *D. sparsipilosum* individuals were encountered. The dominant vegetation within the ecotone was *Artemisia tridentata* Nuttall and *Agropyron* sp.

Forage flights were initiated from vegetation, usually from a perch on a stem of grass or sagebrush. Rarely did the robber flies return to the same perch twice sequentially. The foraging flights covered a distance ranging from 7.6 to 61 cm.

When potential prey was observed, the whole body of the predator was turned to face it. Prey was captured in the air and impaled on the mouthparts before the asilid landed. It was usually manipulated, at least once, during feeding. During this process, the robber fly grasped the substrate with its mid and hind tarsi, and used its fore tarsi to rearrange the prey. Upon completion of feeding, the predator moved its mouthparts in such a way that the emptied body fell in front of the asilid at the feeding site.

Prey taken by *D. sparsipilosum* included one chironomid, and one muscid (Diptera); one tenthredinid, two winged reproductive formicids, three Chalcidoidea (Hymenoptera) and one Coleoptera. Insects larger than the predator were not attacked.

Occasionally an asilid stopped in mid-flight, before making contact with the potential prey, but usually the predator grasped the espied insect and returned to the substrate. On four occasions, *D. sparsipilosum* was unable to subdue the prey

Figure 1. Mating pair of *Dicolonus sparsipilosum.*

it had captured; two such insects that escaped were cuckoo wasps (Chrysididae), both being slightly smaller than the asilid, and more heavily sclerotized than any of the subdued prey.

It is probable that males of *D. sparsipilosum* spend considerable time searching for females, similar to that recorded for other studied species of robber flies (Dennis & Lavigne 1975). Around midday and early afternoon, males were observed making long flights of 1.2 to 1.5 m along grass corridors which occur between groups of sagebrush plants.

No courtship was exhibited by males. The males flew at, and seized, both males and females at random. These encounters sometimes included falling into the vegetation while the pair were still grappling. If the seized fly was a male, contact was broken and the two tended to fly off in opposite directions; if the seized fly was a female, and she successfully eluded his grasp, the male flew off in pursuit of her. Otherwise, mating took place on site.

Mated pairs were observed between 10:33 and 17:30 h. Temperatures at the height the pairs were resting on vegetation ranged from 24.4 to 28.9° C. The pairs take a tail-to-tail position, usually resting vertically with the female facing upwards. Separation occurs when the male releases his claspers and walks away.

Three pairs, timed from the point when first observed, to completion, remained en copula 26, 30 and 58 minutes. Only one mating of 49 minutes duration was followed from start to finish. In this instance, the male flew into a clearing already occupied by a female. When the female initiated a forage flight, the male flew up and grappled with her. They fell into a clump of tangled grass, still struggling, and copulation occurred at 13:14 h. The pair then crawled up a grass stem into a partially shaded location, where the temperature was 24.4° C. At 13:16 h the pair flew 61 cm landing on a sagebrush plant at a height of 25.4 to 30.5 cm. Almost immediately, they flew 61 cm more, landing on a dead sage stem 30.4 cm above the ground, with the female resting on the trunk and the male dangling in the air. At 13:40 h, the female cleaned her eyes, and then her fore tarsi. The male started struggling almost immediately, and after about 10 seconds attained the same perch as the female, with their bodies forming an angle of approximately 140° (Fig. 1). At 13:54 h, the male climbed on the female's back; a short struggle ensued and the former position was resumed. At 14:03 h, the male released his claspers and flew 2.44 m. The female remained in place an additional 2 minutes before flying away.

Acknowledgment

This article was published with the approval of the Director, Wyoming Agricultural Experiment Station as Journal Article No. JA 1662.

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Received 10 August 1991; accepted 5 October 1992.